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(51) International Patent Classification 7 : G11C		A2	(11) International Publication Number: WO 00/36600
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<p>(21) International Application Number: PCT/US99/30326</p> <p>(22) International Filing Date: 20 December 1999 (20.12.99)</p> <p>(30) Priority Data: 60/112,787 18 December 1998 (18.12.98) US 09/465,592 17 December 1999 (17.12.99) US</p> <p>(71) Applicant: LAZERUS NANO TECHNOLOGIES [US/US]; 43 Asilomar Circle, Oakland, CA 94611 (US).</p> <p>(72) Inventors: RUST, Thomas, F.; 43 Asilomar Circle, Oakland, CA 94611 (US). CULVER, Joanne, P.; 43 Asilomar Circle, Oakland, CA 94611 (US).</p> <p>(74) Agents: MEYER, Sheldon, R. et al.; Fliesler Dubb Meyer and Lovejoy LLP, Suite 400, Four Embarcadero Center, San Francisco, CA 94111-4156 (US).</p>		<p>(81) Designated States: JP, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>Without international search report and to be republished upon receipt of that report.</i></p>	
<p>(54) Title: MOLECULAR MEMORY MEDIUM AND MOLECULAR MEMORY INTEGRATED CIRCUIT</p> <p>(57) Abstract</p> <p>A molecular memory media having a media surface and a platform with read/write heads. The platform and media are moved to allow one of addition, removal, and repositioning of atoms, electrons, and charges on a surface of the media. The media is a material capable of storing data written to it, and detectable using a vibrating tip sensor that resonates at a free space value which is phase shifted when charges or anomalies on a surface of the media are present. Other methods of reading and writing to the media are presented. The media may be enhanced by augmenting grain boundaries of the media via deposition and removal of PMMA materials. Servo trenches and sync bits identify positions of the read/write heads and maintain alignment during memory operations.</p> <img alt="A detailed technical diagram of a molecular memory integrated circuit. The diagram shows a top view of a platform with various read/write heads (labeled 10, 80, 110, 120) and a media surface (labeled 90) with grain boundaries (labeled 50). The platform is shown in three different positions (ACT 1, ACT 2, ACT 3) to illustrate the movement and repositioning of the read/write heads. The diagram also shows various other components like 40, 44, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370, 380, 390, 400, 410, 420, 430, 440, 450, 460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560, 570, 580, 590, 600, 610, 620, 630, 640, 650, 660, 670, 680, 690, 700, 710, 720, 730, 740, 750, 760, 770, 780, 790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990, 1000, 1010, 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1100, 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180, 1190, 1200, 1210, 1220, 1230, 1240, 1250, 1260, 1270, 1280, 1290, 1300, 1310, 1320, 1330, 1340, 1350, 1360, 1370, 1380, 1390, 1400, 1410, 1420, 1430, 1440, 1450, 1460, 1470, 1480, 1490, 1500, 1510, 1520, 1530, 1540, 1550, 1560, 1570, 1580, 1590, 1600, 1610, 1620, 1630, 1640, 1650, 1660, 1670, 1680, 1690, 1700, 1710, 1720, 1730, 1740, 1750, 1760, 1770, 1780, 1790, 1800, 1810, 1820, 1830, 1840, 1850, 1860, 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940, 1950, 1960, 1970, 1980, 1990, 2000, 2010, 2020, 2030, 2040, 2050, 2060, 2070, 2080, 2090, 2100, 2110, 2120, 2130, 2140, 2150, 2160, 2170, 2180, 2190, 2200, 2210, 2220, 2230, 2240, 2250, 2260, 2270, 2280, 2290, 2300, 2310, 2320, 2330, 2340, 2350, 2360, 2370, 2380, 2390, 2400, 2410, 2420, 2430, 2440, 2450, 2460, 2470, 2480, 2490, 2500, 2510, 2520, 2530, 2540, 2550, 2560, 2570, 2580, 2590, 2600, 2610, 2620, 2630, 2640, 2650, 2660, 2670, 2680, 2690, 2700, 2710, 2720, 2730, 2740, 2750, 2760, 2770, 2780, 2790, 2800, 2810, 2820, 2830, 2840, 2850, 2860, 2870, 2880, 2890, 2900, 2910, 2920, 2930, 2940, 2950, 2960, 2970, 2980, 2990, 3000, 3010, 3020, 3030, 3040, 3050, 3060, 3070, 3080, 3090, 3100, 3110, 3120, 3130, 3140, 3150, 3160, 3170, 3180, 3190, 3200, 3210, 3220, 3230, 3240, 3250, 3260, 3270, 3280, 3290, 3300, 3310, 3320, 3330, 3340, 3350, 3360, 3370, 3380, 3390, 3400, 3410, 3420, 3430, 3440, 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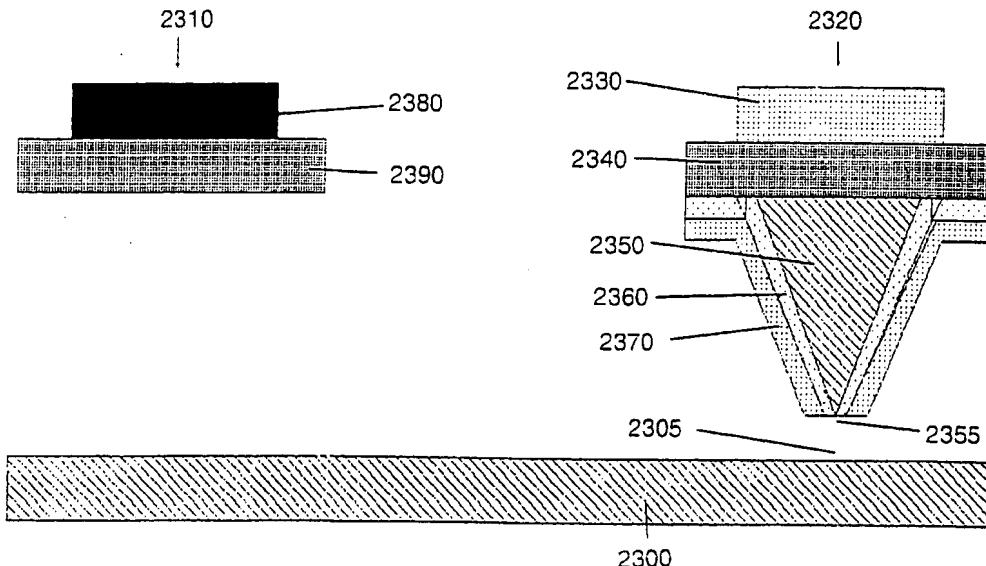
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(54) Title: MOLECULAR MEMORY MEDIUM AND MOLECULAR MEMORY INTEGRATED CIRCUIT



(57) Abstract

A molecular memory media having a media surface (2300) and a platform with an electromagnetic radiation generating source (2310) and an electromagnetic radiation receptor (2320). The platform and media are moved to allow one of addition, removal, and repositioning of atoms, electrons, and charges on a surface of the media. The media is detectable using a vibrating tip sensor that resonates at a free space value which is phase shifted when charges or anomalies of reading and writing to the media are presented.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/30326

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G01B 7/34; H01J 3/14, 7/30; G11C 7/00; G11B 9/00

US CL :Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 73/15; 250/306, 307, 492.2, 492.3; 365/112, 128, 151, 174; 369/101, 126, 176

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

East

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,E	US 6,038,916 A (CLEVELAND et al.) 21 March 2000, Fig. 1.	8, 10, 11, 13-23, 21-23, 27-29, 33, 36, 37, 40, 41, 43, 44, 46, 48, 50, 51, 53-57, 59 and 60
X	US 5,453,970 A (RUST ET AL.) 26 September 1995, Fig. 1	1-60

Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search

28 MARCH 2000

Date of mailing of the international search report

13 JUN 2000

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INTERNATIONAL SEARCH REPORT

International application No.
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,251,200 A (HATANAKA et al.) 05 October 1993, Fig. 2	8, 10, 11, 13-23, 27-29, 33, 36, 37, 40, 41, 43, 44, 46, 48, 50, 51, 53-57, 59 and 60
Y	US 5,216,631 A (SLIWA, JR.) 01 June 1993, Fig. 6.	8, 10, 11, 13-23, 27-29, 33, 36, 37, 40, 41, 43, 44, 46, 48, 50, 51, 53-57, 59 and 60.
X	US 5,187,367 A (MIYAZAKI et al.) 16 February 1993, Fig. 3.	1-7, 9, 12, 24-26, 30-32, 34, 35, 38, 39, 42, 45, 47, 49, 52, 58
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Y		8, 10, 11, 13-23, 27-29, 33, 36, 37, 40, 41, 43, 44, 46, 48, 50, 51, 53-57, 59, 60
X	US 4,987,312 A (EIGLER) 22 January 1991, Fig. 1.	1-7, 9, 12, 24-26, 30-32, 34, 35, 38, 39, 42, 45, 47, 49, 52, 58
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Y		8, 10, 11, 13-23, 27-29, 33, 36, 37, 40, 41, 43, 44, 46, 48, 50, 51, 53-57, 59, 60

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/30326

A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

73/15; 250/306, 307, 492.2, 492.3; 365/112, 128, 151, 174; 369/101, 126, 176